

The invention claimed is:

1. An electric power assist steering system for a vehicle, said steering system comprising:

a steering assembly including a steering wheel connected to a steering column;

an electric motor operatively engaged with said steering assembly for supplying steering torque assist;

a torque detector determining a torque signal that is substantially indicative of driver torque applied to the steering assembly;

a steering column sensor for sensing a steering angle of the steering column and generating a signal indicative thereof;

a first H-infinity controller coupled in a feedback control loop for generating a first feedback control signal as a function of said torque signal and a first characteristic of the steering system;

a second H-infinity controller coupled in the feedback control loop for generating a second feedback control signal as a function of said torque signal and a second characteristic of the steering system; and

a switch for selecting one of the first and second feedback control signals as a function of the sensed steering angle.

2. The steering system as defined in claim 1, wherein said first and second characteristics are determined as a function of at least one of a moment of inertia of the steering column and a torsion stiffness of the steering column.

3. The steering system as defined in claim 2, wherein said first and second characteristics are each determined based on both of the moment of inertia and torsion stiffness of the steering column.

4. The steering system as defined in claim 1, wherein the selected feedback signal is combined with a feedforward signal to provide a motor control signal, and wherein the feedforward signal is generated by applying the torque signal to a boost curve.
5. A steering system as defined in claim 1, wherein said steering assembly further includes a shaft operatively coupled to the steering column and further connected to a rack and pinion assembly, wherein said electric motor is coupled to said shaft.
6. A control system for controlling electric motor torque assist to an electric power assist steering system for a vehicle having a steering assembly including a steering wheel connected to a steering column and an electric motor operatively engaged with the steering assembly for supplying steering torque assist, wherein said control system comprises:
- a torque detector for detecting driver torque and generating a driver torque signal indicative thereof;
 - a steering column sensor for sensing angular position of the steering assembly;
 - a first H-infinity controller coupled in the feedback control loop and generating a first feedback control signal as a function of the driver torque signal and a first characteristic of the steering system;
 - a second H-infinity controller coupled in the feedback control loop and generating a second feedback control signal as a function of the driver torque signal and a second characteristic of the steering system; and
 - a switch for selecting one of the first and second feedback control signals, wherein a motor control signal is generated as a function of the selected feedback control signal.
7. The control system as defined in claim 6, wherein said first and second characteristics are determined as a function of at least one of a moment of inertia of the steering column and a torsion stiffness of the steering column.

8. The control system as defined in claim 7, wherein said first and second characteristics are each determined based on both of the moment of inertia and torsion stiffness of the steering column.

9. The control system as defined in claim 6 further comprising a feedforward signal generated by applying the torque signal to a boost curve, wherein the selected feedback signal is combined with the feedforward signal to provide the motor control signal.